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# E-Learning tools: Engaging Our Students?

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**Abstract**— Since Generation Z students have grown up around WIFI-laptops, video game, etc. they expect technology to be involved in teaching approaches, however students' perception towards e-learning tools indicate that 80% of students (~180 students) prefer a face-to-face approach.

**Keywords**— *E-Learning; Generation Z; Teaching Approach; online resources*

## I. INTRODUCTION (

As academics, it is important to recognise the value of incorporating e-learning activities in our teaching approaches in order to motivate students and provide them with an opportunity to interact and engage with peers in cooperative and collaborative learning. The majority of our audience is Generation Z students, who have been defined as a unique and truly digital native generation of students born between the mid-1990s and 2012 [1]. These students were born at the apex of technology and the internet and have grown up around WiFi- laptops, video games, etc. They are interactive, experts in technology and have high expectations of immediacy [2]. They expect the incorporation of more technology in our teaching approaches, accompanied by more hands-on activities in classes [3]. However, since not all students belong to Generation Z (such as mature students), a more realistic approach is to refer to 'visitors' and 'residents' which is the term for digital users/online engagement [4].

## II. LITERATURE

Due to the evolution of technology, E-Learning tools are not been defined as a single term, and different research refers to them as "an information system that can integrate a wide variety of instructional material" others as "technology intervention in the learning process" [5 -6]. Students' motivation and engagement in their learning process should be subjected to constant review, in order to enhance students learning experience. Motivation is an essential factor for students to learn and despite Generation Z students being born in the apex of a technological era and their expectation that technology must be included as part of the teaching approaches [2], they also must have a positive attitude towards IT [5]. Previous research also highlighted that, in order to provide a successful learning experience and make activities

interesting to learners, proper and clear instructions must be provided [7].

Figure 1 shows the Technology Acceptance Model (TAM)

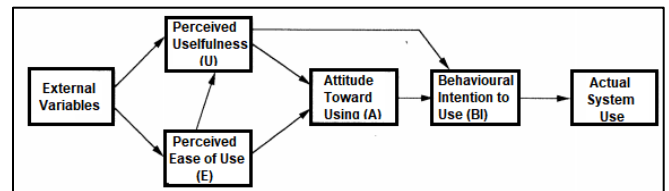


Fig 1. Technology Acceptance Model, TAM [8]The Technology

Acceptance Model outlines the stages involved prior to a system being used. External variables, in this situation, are represented by the use of virtual learning environment (e.g. Moodle-Blackboard) as a learning platform and by the insistence, of academics, that students make use of this system. i.e. its perceived usefulness and perceived ease of use: if positive attitudes are developed towards the system, then users develop the intention to make use of it. And, thus, Moodle/Blackboard is successfully introduced as a key component of the student experience [8].

## III. METHODOLOGICAL APPROACH

In order to collect information regarding students' perception towards E-learning tools a survey for engineering students at different levels of mechanical engineering degree at four different institutions was conducted. The survey was conducted to full time undergraduate students and to Graduate Apprentice (GA) students.

Table I and Table II shows number of participants and demographic details.

TABLE I. DEMOGRAPHIC DETAILS OF PARTICIPANTS IN FULL TIME EDUCATION

	Level	Study	# Students	University	Location
1	1	Mechanical Engineering	50	A	Scotland
2	2	Mechanical Engineering	41	A	Scotland
3	3	Computer Aided Mechanical	21	B	Scotland
4	3	Mechanical Engineering	24	C	England
5	1	Integrated Master of Industrial Electronics Engineering and Computers	41	D	Portugal

TABLE II. DEMOGRAPHIC DETAILS OF PARTICIPANTS IN GRADUATE APPRENTICESHIP (GA) SCHEME

	Level	Study	# Students	University	Location
1	1	Mechanical Engineering	7	A	Scotland
2	1	Mechanical Engineering	5	B	Scotland
3	2	Mechanical Engineering	5	A	Scotland
4	2	Mechanical Engineering	5	B	Scotland

In order to further obtain and compare students' perception towards E-learning tools a focus group of 7 students in Level 2 from University A in mechanical engineering degree was also conducted.

The session lasted an hour and questions followed the TAM model as described in the literature review. Appendix shows the questions involved.

TABLE III. DEMOGRAPHIC DETAILS OF PARTICIPANTS IN GRADUATE APPRENTICESHIP (GA) SCHEME

	Age	Gender	Student
1	22	F	Erasmus
2	20	M	Home Student
3	19	M	Home Student
4	19	M	Home Student
5	21	F	Home Student
6	22	M	Home Student
7	21	M	Home Student

The focus group results were analysed following a qualitative approach. Limitations that should be considered are i) small number of respondent and ii) high degree of subjectivity.

#### IV. RESULTS AND DISCUSSION

Results from the survey regarding students' knowledge towards E-learning tools are observed in Fig 2. for Undergraduate students and Fig 3. for Graduate Apprentice students.

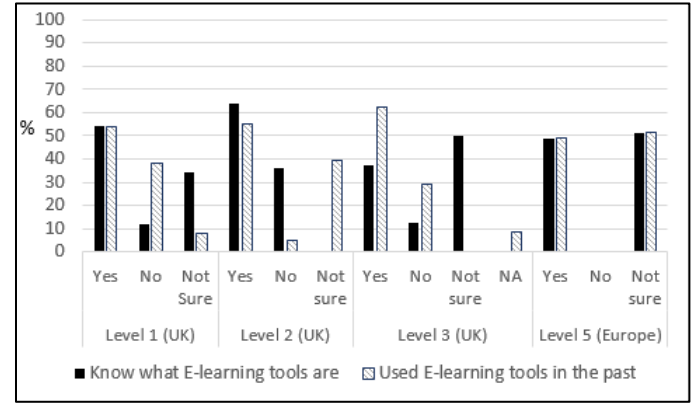


Fig 2. Undergraduate students' knowledge towards E-Learning tools.

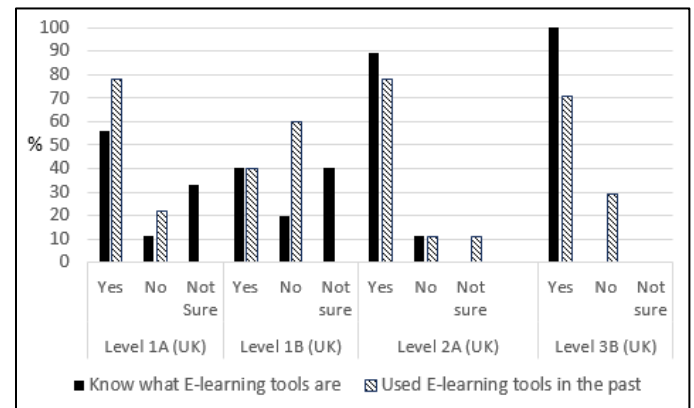


Fig 3. Graduate Apprenticeship students' knowledge towards E-Learning tools.

When analysing Fig 2. and Fig 3. it was observed that at least 37.5% of undergraduate students have an understanding of what E-learning tools are, with a maximum of 81% of the students in undergraduate full time (Level 2) and 100% for GA at level 3, however this outcome does not seem to be very clear as when asking if they have used E-learning tools in the past 39.6% of students (Level 2), answered that they were not sure and 29% of GA students answered that they haven't used E-learning tools.

Figures 4 and 5 shows the results of students' likeability towards E-learning tools

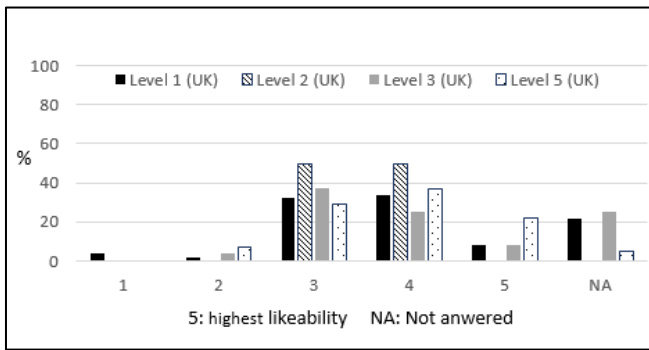


Fig 4. E-Learning tools likeability for full time undergraduate students.

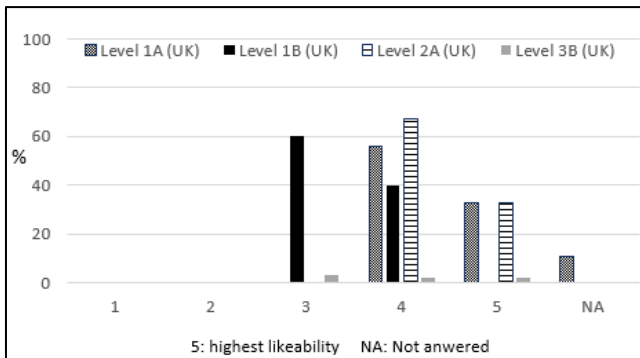


Fig 5. E-Learning tools likeability for Graduate Apprenticeship students.

From Fig 4 it can be observed that the majority of the students rated their likeability towards E-learning tools between 3 and 4, compared to Fig 3, where Graduate Apprenticeship (GA) rate their knowledge of E-Learning tools at a higher level, and in Fig 5, where it can be observed that GA students' likeability toward E-learning tools is rated more at levels 4-5.

This latter result is probably related to the fact that the GA Programme involves more distance learning, making students more prompt of using E-learning resources.

When asking students to provide 3 words to define e-learning tool, the most popular for all levels was accessible, fast and easy. When asking for 3 words to define worst thing about E-learning tools, the most popular were: internet dependency, confusing. and impersonal/crash (both rated at same level). Having students including the word "confusing" as one of the most popular words to define worst thing about e-learning tools, flags up the importance of providing clear instructions if we want students to engage on the activity. This is in agreement with research conducted by Keller and Suzuki 2010.

From the Focus Group conducted to Level 2 undergraduate students, 89% of the students felt that computers/laptops helped them to use E-learning tools and that they were great to use as these tools avoid arranging physical meetings since everything is done online, however it was highlighted the importance of reliable internet connection to undertake any task involving E-learning tools.

In regards to the usefulness of E-learning tools in engineering courses, 87% of the students agreed that if time is not an issue, assessment/activities involving E-learning tools

will engage them, however 80% of the students prefer a blended approach as everything online can be an issue for some students (e.g. migraines). A positive thing is that by doing online activities, no paper is printed contributing to the environment.

Students highlighted that digital material is easy to download, however the major problem is related to the submission process as 68% of students commented that they had doubts if the submission was conducted correctly due to lack of a notification on their submission. This created anxiety issues for some of them.

When discussing the attitude/enjoyment towards using E-Learning tools, 35% of the students mentioned that using the word "enjoyment" was too strong as sometimes it can be ambiguous; and that the activity involving E-learning tools is only enjoyable when is 100% structured and no doubts are raised. Also 93% of students mentioned that a schedule for each activity was expected as this makes things easier and sometimes academics don't provide this.

When following the TAM (Fig. 1), students were asked to describe E-learning to a non-student (Behavioral Intention to Use), the majority described it as "E-learning is learning using internet; is like having the information in paper but online".

When discussing if they could choose between E-learning approaches and face-to-face, 80% of the students attending the focus group preferred a face-to-face approach as they could ask questions and things were easier to understand if an explanation was required.

## V. CONCLUSIONS

- E-learning tools are enjoyable if they are well explained, however 80% of the students would prefer a face-to-face approach.
- 68% of the students have doubts if submissions have been done correctly as sometimes no notifications are received (internet/technology not trusted 100%).
- Students seemed not to be 100% clear on what E-Learning tools are.
- The 3 most popular words defining E-Learning tools are: accessible, fast and easy.
- The 3 most popular words defining worst thing about E-Learning tools are: internet dependency, impersonal and confusing.

The Graduate Apprenticeship Programme allows more involvement with online activities (E-learning tool) increasing students' likeability and recognizing its important towards them, especially at later years in their degree

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## APPENDIX

### Questions for Focus Group:

#### External Variables

What sort of things help you use e-Technology?

What sort of things prevent you, like lack of time, no access to computers, etc?

Do you use e-Learning in all of your modules? How do you feel about that?

#### Perceived Usefulness:

Do you find eLearning useful to you in your course? Why / why not?

What's the biggest benefit to you in using eLearning approaches?

What's the biggest problem in using eLearning?

#### Perceived Ease of Use

Is eLearning easy for you? In what way?

Is it easy to access?

Easy to operate?

Easy to download and submit material?

#### Attitudes Towards Using:

Do you enjoy eLearning? In what way?

Do you prefer other approaches? Which approaches / why?

Do you look forward to using eLearning tools? In what way / why not?

eLearning should be easy to access and use – is this the case for you? Describe that;

#### Behavioural Intention to Use:

So – if you were describing eLearning to a non-student, what would you say?

Would you recommend, to other lecturers, that they use eLearning? What would you say?

If you had to choose between eLearning approaches and face-to-face contact, which would you prefer and why?

#### Actual System Use:

Do you like the system used in this university (Moodle or Blackboard?)

What do you like best?

What would you change, if you could?